EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

November 6, 2019

Bruce Fitzback
Bertin Engineering
39 Elm Street
Southbridge, MA 01550

RE: Wetland Resource Evaluation, 223.5 Charlton Road, Spencer, Massachusetts

Dear Mr. Fitzback:

On September 20 & 27, 2019, EcoTec, Inc. inspected the above-referenced property for the presence of wetland resources as defined by: (1) the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40; the "Act") and its implementing regulations (310 CMR 10.00 *et seq.*; the "Regulations"); (2) the Town of Spencer Wetlands Protection Bylaw and its implementing regulations; and (3) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands). Scott Jordan and Arthur Allen, CPSS conducted the inspections.

The subject site consists of approximately 33-acres located off Charlton Road and Bacon Hill Road in Spencer, Massachusetts. The upland portions of the site consist of recently, selectively cleared upland forest. Plant species observed include northern red oak (*Quercus rubra*), eastern white pine (*Pinus strobus*), and red maple (*Acer rubrum*) trees and/or saplings; mountain laurel (*Kalmia latifolia*) shrubs; and hayscented fern (*Dennstaedtia punctilobula*) ground cover. The wetland resources observed on the site are described below.

Methodology

The site was inspected, and areas suspected to qualify as wetland resources were identified. The boundary of Bordering Vegetated Wetlands or, in the absence of Bordering Vegetated Wetlands, Bank was delineated in the field in accordance with the definitions set forth in the regulations at 310 CMR 10.55(2)(c) and 310 CMR 10.54(2). Section 10.55(2)(c) states that "The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist." Section 10.54(2)(c) states that "The upper boundary of Bank is the first observable break in the slope or the mean annual flood level, whichever is lower." The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy "*BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology*," issued March 1, 1995; and (2) "*Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook*," produced by the Massachusetts Department of Environmental Protection, dated March 1995. The plant taxonomy used in this report is based on the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Fish and Wildlife Service, U.S. Department of the Interior, 1988). Federal wetlands were presumed to have boundaries conterminous with the

delineated Bordering Vegetated Wetlands and Bank. One set of DEP Bordering Vegetated Wetland Delineation Field Data Forms completed for observation plots located in the wetlands and uplands near flag A13 is attached. The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the delineated wetland resources.

Flag Numbers	Flag Type	Wetland Types and Locations
Start A0 to A13 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the northeastern portion of the site that is associated with an intermittent stream.
Start B1 to B80 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands or Bank located in the eastern portion of the site that is associated with an intermittent stream.
Start C1 to C21, D1 to D43 Stop (C1 connect to D1)	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the western portion of the site that is associated with an intermittent stream.
Start E1 to E19 (E19 connect to E1)	Blue Flags	Boundary of Isolated Vegetated Wetland located in the southwestern portion of the site subject to jurisdiction under the Bylaw. Would not qualify as Isolated Land Subject to Flooding.

Findings

Wetland A / B (i.e., flags A0 to A13 and B1 to B80) consists of a wooded swamp and wet meadow located in the eastern portion of the site that is associated with an intermittent stream. Plant species observed include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), and eastern hemlock (*Tsuga canadensis*) trees and/or saplings; highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), northern spicebush (*Lindera benzoin*), and sweet pepper-bush (*Clethra alnifolia*) shrubs; and cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), goldenrods (*Solidago spp.*), sedges (*Cyperaceae spp.*), and rushes (*Juncaceae spp.*) ground cover. Evidence of wetland hydrology, including hydric soils, saturated soils, evidence of flooding, and drainage patterns, was observed within the delineated wetland. This vegetated wetland borders an intermittent stream; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the intermittent stream would be regulated as Bank under the Act and Bylaw. A 100-foot Buffer Zone extends horizontally outward from the edge of Bordering Vegetated Wetlands and Bank under the Act and Bylaw.

Wetland C-D (i.e., flags C1 to C21 and D1 to D43) consists of a wooded swamp and wet meadow located in the western portion of the site that is associated with an intermittent stream. Plant species observed include red maple (*Acer rubrum*) trees and/or saplings; common winterberry (*Ilex verticillata*), arrow-wood (*Viburnum dentatum*), northern spicebush (*Lindera benzoin*), and American elderberry (*Sambucus canadensis*) shrubs; and sedges (*Cyperacea spp.*), and rushes (*Juncaceae spp.*) ground cover. Evidence of wetland hydrology, including hydric soils, saturated soils, evidence of flooding, and drainage patterns, was observed within the delineated wetland. This vegetated wetland borders an intermittent stream; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the intermittent stream would be regulated as Bank under the Act and Bylaw. A 100-foot Buffer Zone extends

horizontally outward from the edge of Bordering Vegetated Wetlands and Bank under the Act and Bylaw.

Wetland E (i.e., flags E1 to E19) consists of an isolated vegetated wetland located in the southwestern portion of the site. Plant species observed in this sloping, isolated wetland include cattail (*Typha latifolia*), sedges (*Cyperaceae spp.*), rushes (*Juncacea spp.*) and Joe-pye weed (*Eupatoriadelphus maculatus*.) ground cover. Hydric soils and other evidence of wetland hydrology, including saturated soils, and evidence of flooding, were observed within the delineated wetland. This wetland does not border a creek, stream, river, pond, or lake; accordingly, it would not be regulated as Bordering Vegetated Wetlands under the Act. Section 10.57(2)(b)1. states that "Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area that at least once per year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches." Based upon field observations, the potential ponding area appears to be too small to hold the requisite volume and depth of water to be regulated as Isolated Land Subject to Flooding under the Act. Accordingly, this area would not be subject to jurisdiction under the Act. However, depending upon the proximity of this area to a Bordering Vegetated Wetlands, this area may be subject to jurisdiction as a federal wetland. Federal wetlands do not have a Buffer Zone. This area would be subject to jurisdiction under the Bylaw. A 100-foot Buffer Zone extends horizontally outward from the edge of Isolated Vegetated Wetlands under the Bylaw.

Bordering Land Subject to Flooding is an area that floods due to a rise in floodwaters from a bordering waterway or water body. Where flood studies have been completed, the boundary of Bordering Land Subject to Flooding is based upon flood profile data prepared by the National Flood Insurance Program. Section 10.57(2)(a)3. states that "The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm." Based upon a review of the Flood Insurance Rate Map, Worcester County, Massachusetts, Map Number 25027C0780E, Effective Date 7/4/2011, there are no mapped Zone A (i.e., 100-year floodplain with an unspecified flood elevation) / AE (i.e., 100-year floodplain) floodplains located on or near the site. The project engineer should evaluate the most recent National Flood Insurance Program flood profile data to determine if Bordering Land Subject to Flooding occurs on the site. Bordering Land Subject to Flooding would occur in areas where the 100-year flood elevation is located outside of or upgradient of the delineated Bordering Vegetated Wetlands or Bank boundary. Bordering Land Subject to Flooding does not have a Buffer Zone under the Act but does have a 100-foot Buffer Zone under the Bylaw.

The Massachusetts Rivers Protection Act amended the Act to establish an additional wetland resource area: Riverfront Area. Based upon a review of the current USGS Map (i.e., Worcester South Quadrangle, dated 1983, attached) and observations made during the site inspection, two streams that are not shown on the USGS Map are located in the eastern and western portions of the site. The watershed areas for these streams at the site were determined to be less than 0.5 square miles. As such, the streams would be designated intermittent under the Massachusetts Wetlands Protection Act regulations. Furthermore, based upon a review of the current USGS

Map and observations made during the site inspection, there are no other mapped or unmapped streams located within 200 feet of the site. Accordingly, Riverfront Area would not occur on the site. Riverfront Area does not have a Buffer Zone under the Act.

The Regulations require that no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures set forth at 310 CMR 10.59. Based upon a review of the *Massachusetts Natural Heritage Atlas*, 14th edition, Priority Habitats and Estimated Habitats from the NHESP Interactive Viewer, valid from November 6, 2019, and Certified Vernal Pools from MassGIS, there are no Estimated Habitats [for use with the Act and Regulations (310 CMR 10.00 *et seq.*)], Priority Habitats [for use with Massachusetts Endangered Species Act (M.G.L. Ch. 131A; "MESA") and MESA Regulations (321 CMR 10.00 *et seq.*)], or Certified Vernal Pools on or in the immediate vicinity of the site. A copy of this map is attached.

The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. Brief descriptions of our experience and qualifications are attached. If you have any questions, please feel free to contact me at any time.

Cordially,
ECOTEC, INC.

Scott Jordan

Scott Jordan, CPESC
Senior Environmental Scientist

Attachments (9 pages)

11/W/SpencerCharltonRd223.5Report

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant | Prepared by: EcoTec, Inc | Project Location: 223.5 Charlton Rd., Spencer | DEP File #

Section I. Vegetation | Number: TPW @ A13 | Transect # WETLAND | Date of Delin: 9/20/2019

A. Sample layer and plant species (Enter largest to smallest % cover by layer)			Percent Cover (or basal area)	Percent Dominance	Dominant Plant?	Wetland Indicator Category	
Tree	Eastern hemlock	Tsuga canadensis	60	70.6	YES	FACW	*
	Red maple	Acer rubrum	10	11.8	NO	FAC	*
	White pine	Pinus strobus	15	17.6	NO	FACU	
Sapling	Eastern hemlock	Tsuga canadensis	15	100.0	YES	FACW	*
Shrub	None						
Ground	Sphagnum moss	Sphagnum sp.	20	50.0	YES	FACW	*
	Red maple	Acer rubrum	20	50.0	YES	FAC	*
Vine							

Vegetation Conclusions

Number of dominant wetland indicator plants **4** | Number of dominant non-wetland indicator plants **0**

Is the number of dominant wetland plants equal or greater than the number of dominant non-wetland plants? YES

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant | Prepared by: EcoTec, Inc | Project Location: 223.5 Charlton Rd., Spencer | DEP File #

Section II. Indicators of Hydrology | Number: TPW @ A13 | Transect # WETLAND | Date of Delin: 9/20/2019

1. Soil Survey

Is there a published soil survey for this site?

title/date

map number

soil type mapped

hydric soil inclusions

Are field observarions consistent with soil survey?

Remarks:

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottle Color
Litter	1		
O	6-0		
A	0-3	10YR 2/1	
Bg	3-6	2.5Y 5/1	
R	6+		

Remarks very stony fine sandy loam

3. Other

Conclusion: Is the soil hydric?

Yes

Other Indicators of hydrology (check all that apply):

- ☐ Site Inundated
- ☐ Depth to free water in observation hole
- ☐ Depth to soil saturation in observation hole
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in BVWs
- ☐ Oxidized rhizospheres
- ☐ Water stained leaves
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other):
- ☐ Other:

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ number of non-wetland indicator plants	☑	☐
Wetland hydrology present:		
Hydric soil present	☑	☐
Other indicators of hydrology present	☐	☑
Sample Location is in a BVW	☑	☐

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant | Prepared by: EcoTec, Inc | Project Location: 223.5 Charlton Rd., Spencer | DEP File #

Section I. Vegetation | Number: TPU @ A13 | Transect # UPLAND | Date of Delin: 9/20/2019

A. Sample layer and plant species (Enter largest to smallest % cover by layer)			Percent Cover (or basal area)	Percent Dominance	Dominant Plant?	Wetland Indicator Category	
Tree	Eastern hemlock	Tsuga canadensis	60	80.0	YES	FACW	*
	Black birch	Betula lenta	15	20.0	YES	FACU	
Sapling	None						
Shrub	None						
Ground							
Vine							

Vegetation Conclusions

Number of dominant wetland indicator plants **1** | Number of dominant non-wetland indicator plants **1**

Is the number of dominant wetland plants equal or greater than the number of dominant non-wetland plants? YES

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Form

Applicant | Prepared by: EcoTec, Inc | Project Location: 223.5 Charlton Rd., Spencer | DEP File #

Section II. Indicators of Hydrology | Number: TPU @ A13 | Transect # UPLAND | Date of Delin: 9/20/2019

1. Soil Survey

Is there a published soil survey for this site?

title/date

map number

soil type mapped

hydric soil inclusions

Are field observarions consistent with soil survey?

Remarks:

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottle Color
Litter	1		
O	4-0		
A	0-2	10YR 2/2	
Bw	2-8	10YR 4/6	
R	8+		

Remarks very stony fine sandy loam

3. Other

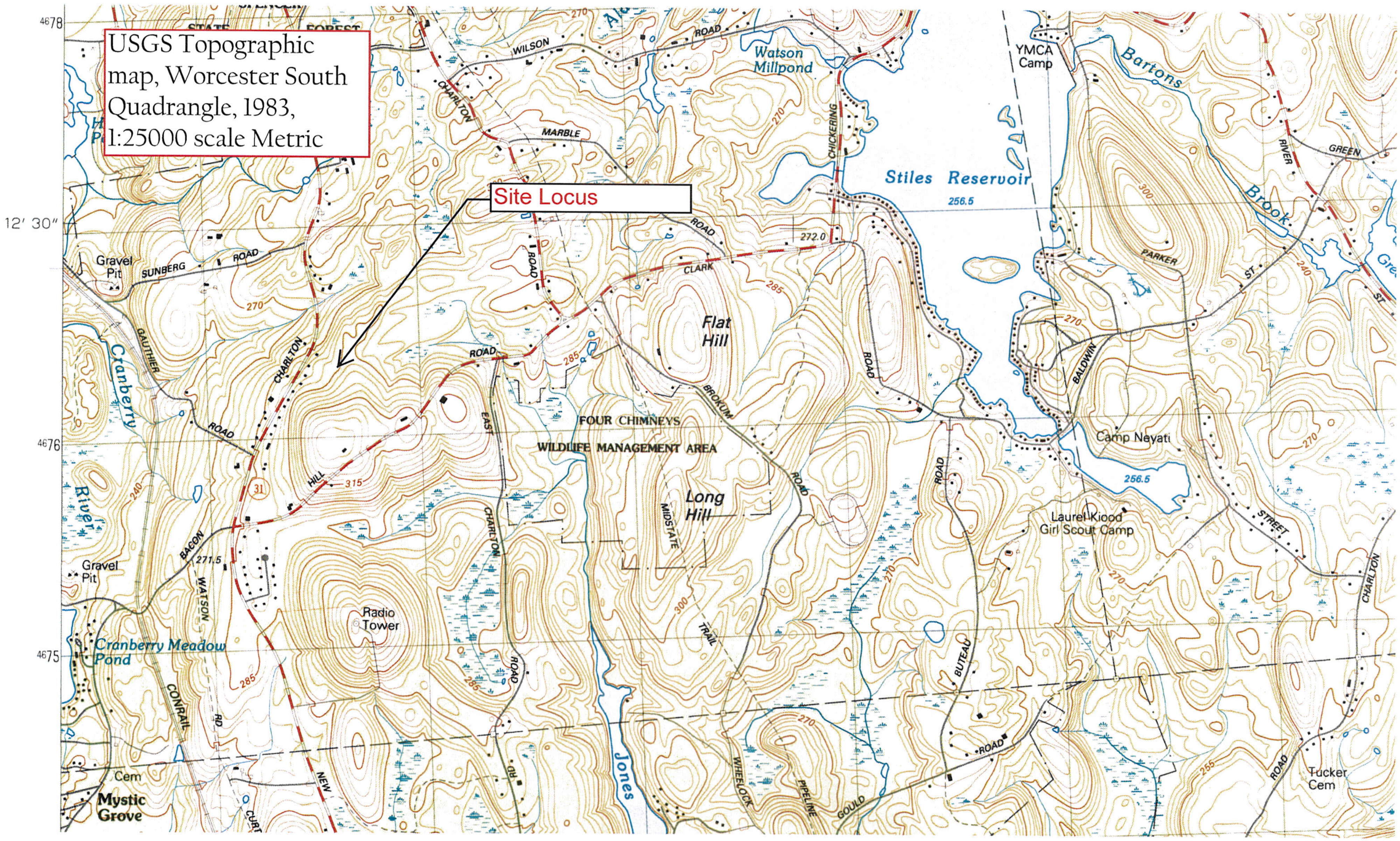
Conclusion: Is the soil hydric? No

Other Indicators of hydrology (check all that apply):

- ☐ Site Inundated
- ☐ Depth to free water in observation hole
- ☐ Depth to soil saturation in observation hole
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in BVWs
- ☐ Oxidized rhizospheres
- ☐ Water stained leaves
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other):
- ☐ Other:

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ number of non-wetland indicator plants	☑	☐
Wetland hydrology present:		
Hydric soil present	☐	☑
Other indicators of hydrology present	☐	☑
Sample Location is in a BVW	☐	☑


USGS Topographic map, Worcester South Quadrangle, 1983, 1:25000 scale Metric
Site Locus
4678
12' 30"
4676
4675
Watson Millpond
Stiles Reservoir
256.5
YMCA Camp
Bartons
Brook
Camp Neyati
Laurel Kiood Girl Scout Camp
Flat Hill
Long Hill
FOUR CHIMNEYS
WILDLIFE MANAGEMENT AREA
Radio Tower
Gravel Pit
Cranberry
River
Cranberry Meadow Pond
Mystic Grove
Cem
Tucker Cem
Jones
WILSON
ROAD
CHARLTON
MARBLE
CHICKERING
CLARK
BROKUM
EAST
HILL
SUNBERG
GAUTHIER
BACON
WATSON
RD
CONRAIL
NEW
MIDSTATE
TRAIL
WHEELOCK
PIPELINE
GOULD
BUTEAU
BALDWIN
PARKER
RIVER
GREEN
ST
STREET
272.0
271.5
315
300
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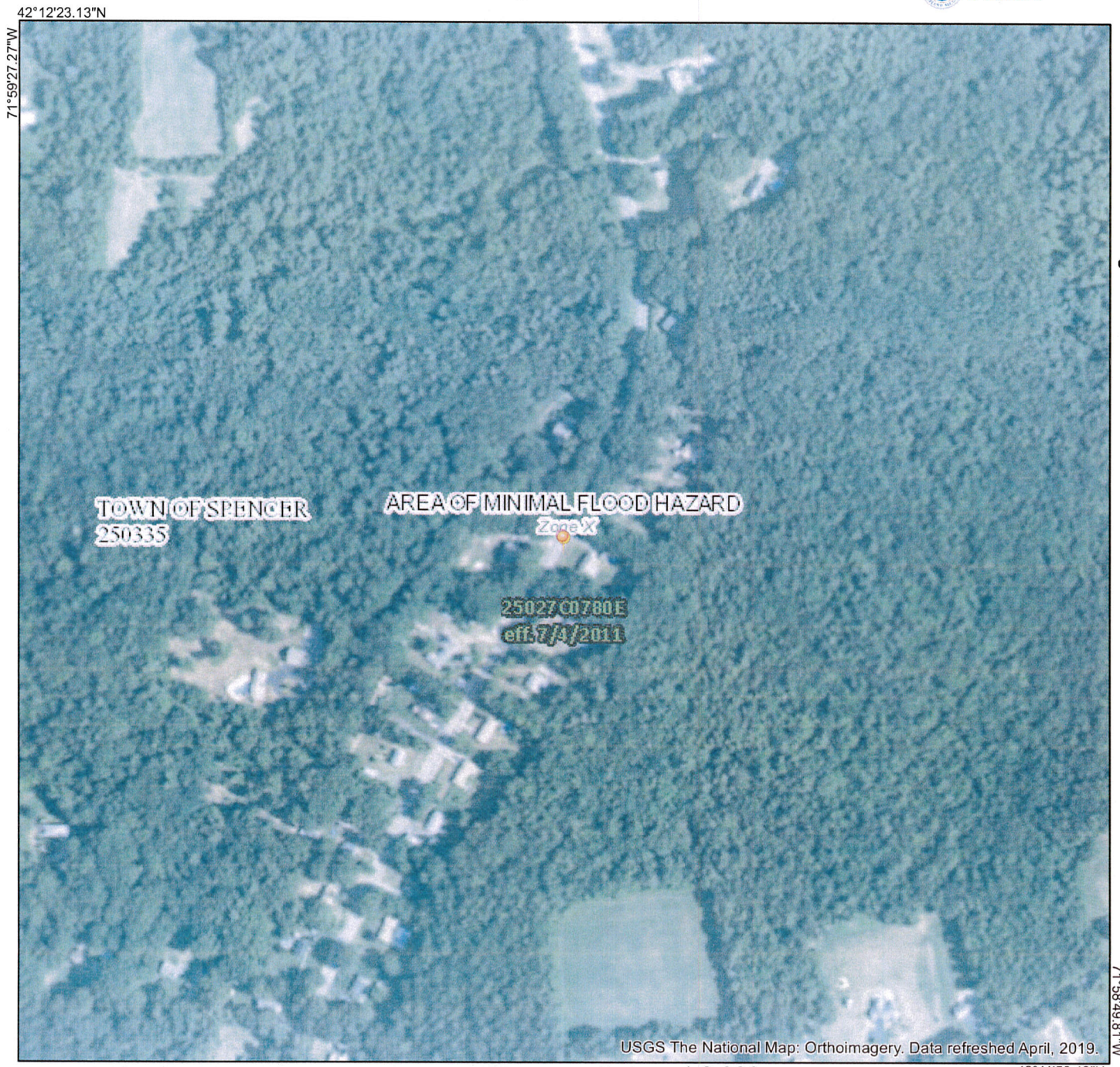
270
255
240
31

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

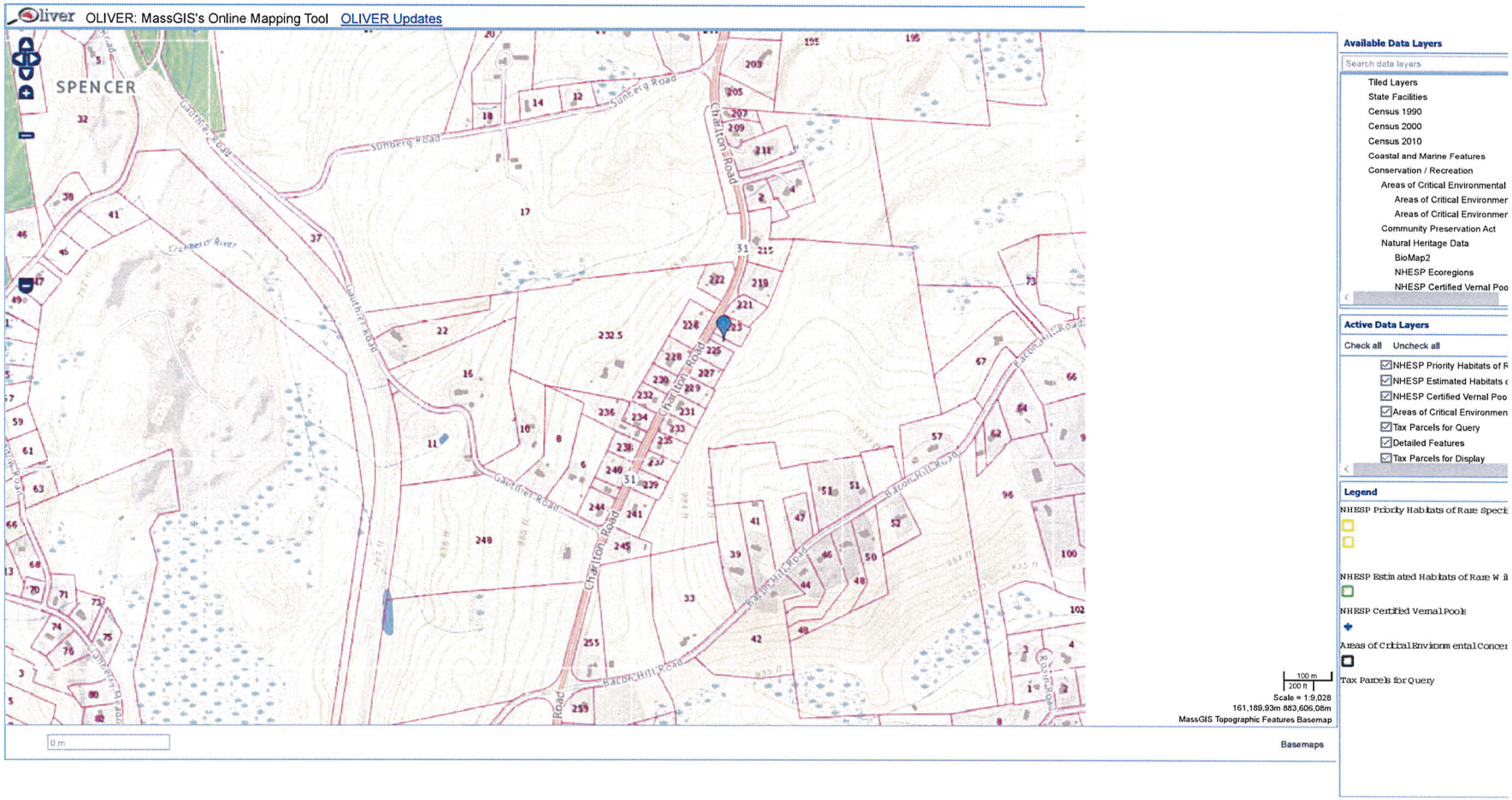
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/30/2019 at 9:13:46 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Natural Heritage Atlas Online Data Viewer Output 11/6/2019

EcoTec, Inc.

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Scott Jordan, CPESC
Senior Environmental Scientist

Scott Jordan is an Environmental Scientist with EcoTec, Inc. Since joining EcoTec in 2000, Mr. Jordan's duties have included wetland resource evaluation and delineation; erosion and sediment control planning and monitoring, environmental monitoring, including water quality analysis, sediment analysis and wildlife habitat impact analysis; environmental permitting at local, state, and federal level; pond and stream evaluation; wildlife habitat evaluation, vernal pool evaluation; and wetland restoration and replication design and oversight. He has served as an environmental consultant to the development community, engineering firms, municipalities, and conservation commissions. Prior to joining EcoTec, Mr. Jordan was the Senior Laboratory Technician for GeoComp Corporation where he performed numerous physical properties analysis of soils and geosynthetic materials in accordance with ASTM, and AASHTO specifications. His approximately seven years experience evaluating New England soils includes soil analysis and classification of site-remediated soils with oil and hazardous material contamination. His educational background includes courses in organic and inorganic chemistry, biology, botany and comparative vertebrate physiology, with extensive coursework in ecology and wildlife biology; and he has completed several professional training seminars including erosion and sediment control, soil evaluation, wildlife habitat evaluation, wetland mitigation, vernal pool evaluation, water quality assessment using macro-invertebrates, and river morphology and functions. He has participated in several rare species and wildlife monitoring and inventory projects, including marsh bird surveys, marbled salamander (*Ambystoma opacum*) survey, great laurel (*Rhododendron maximum*) survey, wood turtle (*Glyptemys insculpta*) habitat assessments and sweeps, eastern box turtle (*Terrapene carolina*) habitat assessments, and greater black-backed gull (*Larus marinus*) inventory. His prior research experience includes behavioral and acoustic studies of the common loon (*Gavia immer*) in northwestern Maine.

Education: Bachelor of Science: Biology - Wildlife and Environmental, *Cum Laude*
Framingham State College, 2000
Biotechnology Certificate
Middlesex Community College, 1994

Professional Affiliations:
Certified Professional in Erosion and Sediment Control (Cert. #3644)
Massachusetts Association of Conservation Commissioners
Association of Massachusetts Wetland Scientists
Society of Wetland Scientists
Society of Soil Scientists of Southern New England

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Arthur Allen, CPSS
Vice President
Soil & Wetland Scientist

Arthur Allen is a senior environmental scientist with certifications in soil and wetland science and a strong background in geology, forestry, hydrology and ecology. Since 1995, his work with EcoTec has involved wetland delineation, wildlife habitat evaluation, environmental permitting (federal, state and local), environmental monitoring and peer reviews for private landowners, developers, major corporations and regulatory agencies in addition to contaminated site assessment and the description, mapping and interpretation of soils. Prior to joining EcoTec, Mr. Allen mapped and interpreted soils in Franklin County, MA for the U.S.D.A. Natural Resources Conservation Service (formerly Soil Conservation Service) and was a research soil scientist at Harvard University's Harvard Forest. Since 1994, Mr. Allen has been assisting the Massachusetts Department of Environmental Protection and the Massachusetts Association of Conservation Commissions as an instructor in the interpretation of soils for wetland delineation and for the Title V Soil Evaluator program.

Mr. Allen has a civil service rating as a soil scientist, an undergraduate degree in Natural Resource Studies and a graduate certificate in Soil Studies. His work on the Franklin County soil survey involved interpretation of landscape-soil-water relationships, classifying soils and drainage, and determining use and limitation of the soil units that he delineated. As a soil scientist at the Harvard Forest, Mr. Allen was involved in identifying the legacies of historical land-use in modern soil and vegetation at a number of study sites across southern New England. He has a working knowledge of the chemical and physical properties of soil and water and how these properties interact with the plants that grow on a given site. While at Harvard Forest he authored and presented several papers describing his research results which were later published. In addition to his aforementioned experience, Mr. Allen was previously employed by the Trustees of Reservations as a land manager and by the Town of North Andover, MA as a conservation commission intern.

Education:
1993-Graduate Certificate in Soil Studies, University of New Hampshire
1982-Bachelor of Science in Natural Resource Studies, University of Massachusetts

Professional Affiliations:
Certified Professional Soil Scientist (ARCPACS CPSS #22529)
New Hampshire Certified Wetland Scientist (#019)
Registered Professional Soil Scientist & Board Member - SSS of SNE
Massachusetts Arborists Association-Certified Arborist (1982 – 1998)
Massachusetts Association of Conservation Commissions - Member
Society of Wetland Scientists - Member

Refereed Publications:
Soil Science and Survey at Harvard Forest. A.Allen. *In*: Soil Survey Horizons. Vol. 36, No. 4, 1995, pp. 133-142.
Controlling Site to Evaluate History: Vegetation Patterns of a New England Sand Plain. G.Motzkin, D.Foster, A.Allen, J.Harrod, & R.Boone. *In*: Ecological Monographs 66(3), 1996, pp. 345-365.
Vegetation Patterns in Heterogeneous Landscapes: The Importance of History and Environment. G.Motzkin, P.Wilson, D.R.Foster & A.Allen. In: Journal of Vegetation Science 10, 1999, pp. 903-920.